E 1.28:SOLAR/1025-79/06

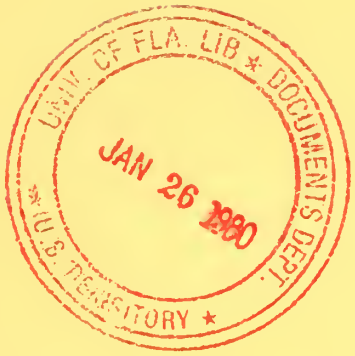
Accn. 1215967

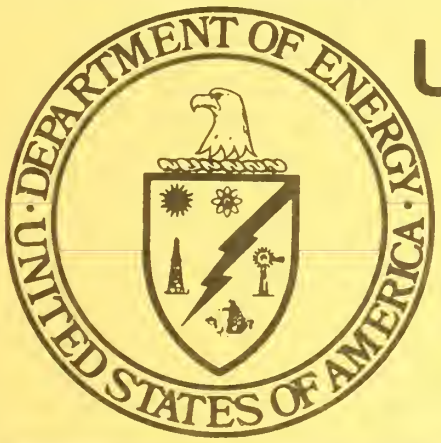
SOLAR/1025-79/06

Monthly Performance Report

HELIO THERMICS, INC. - LOT 6

JUNE 1979





U.S. Department of Energy

National Solar Heating and Cooling Demonstration Program

National Solar Data Program

NOTICE

This report was prepared as an account of work sponsored by the United States Government. Neither the United States nor the United States Department of Energy, nor any of their employees, nor any of their contractors, subcontractors, or their employees, make any warranty, express or implied, or assume any legal liability or responsibility for the accuracy, completeness or usefulness of any information, apparatus, product or process disclosed, or represents that its use would not infringe privately owned rights.

MONTHLY PERFORMANCE REPORT

HELIO-THERMICS, INC.
HOUSE LOT 6

JUNE 1979

I. SYSTEM DESCRIPTION

Helio-Thermics Inc., House Lot 6 is one of two instrumented single-family residences in Greenville, South Carolina. The home has approximately 1086 square feet of conditioned space. Solar energy is used for space heating the home and preheating domestic hot water (DHW). The solar energy system utilizes the attic space as the solar energy collector. The attic roof faces 10 degrees west of south and is pitched at an angle of 51 degrees to the horizontal. Solar energy enters the attic through a 416-square-foot aperture which is double-glazed with corrugated, translucent, fiberglass-reinforced, acrylic panels. The interior of the attic is painted black to maximize the absorption of solar energy. Warm air accumulates in the peak of the attic roof and circulates through the conditioned space or through storage by an air handler. Solar energy is stored in an 870-cubic-foot storage bin containing 85,460 pounds of crushed rock. The bin is located under the house and has 2 inches of polystyrene insulation. Cold water is preheated in the attic by thermo-siphoning water from the 80-gallon preheat tank through a manifold system of copper tubes. These tubes are attached to black sheet-metal plates, thus enhancing absorption of solar radiation for preheating the water as it circulates to and from the preheat tank. Preheated city water is stored in the preheat tank and supplied, on demand, to a conventional 80-gallon DHW tank. When solar energy is insufficient to satisfy the space heating load, a water-to-air heat exchanger in the hot air supply-duct provides auxiliary energy for space heating. A gas-fired water heater provides auxiliary energy for the water-to-air heat exchanger and the DHW. The system, shown schematically in Figure 1, has seven modes of operation.

Mode 1 - Collector-to-Storage: This mode activates when there is no demand for space heating and the collector supply-duct temperature is 26°F higher than the storage temperature. This mode terminates when the temperature difference between the collector and storage is less than 16°F.

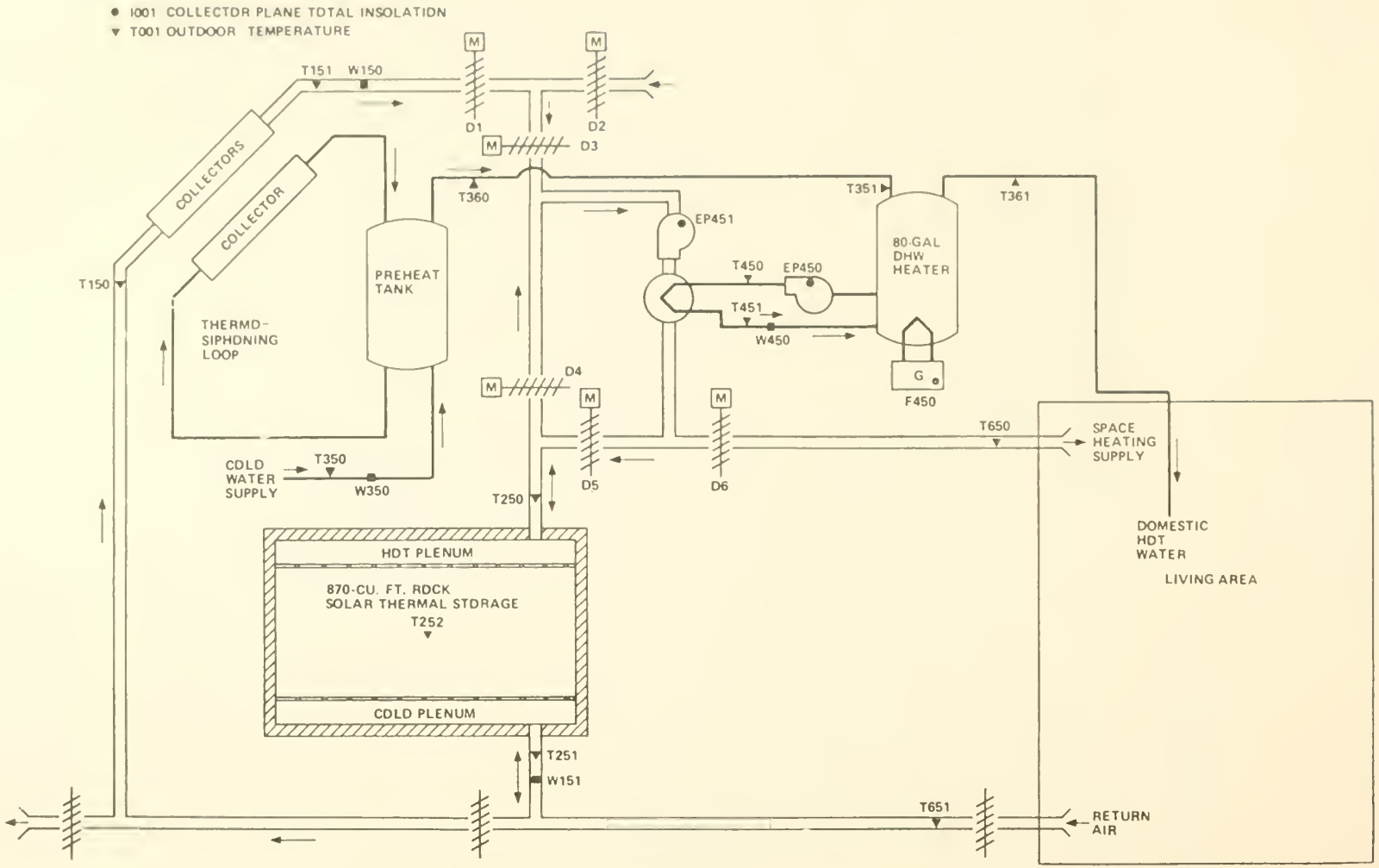


Figure 1. HELIO THERMICS, INC., LOT NO. 6, SOLAR ENERGY SYSTEM SCHEMATIC

Mode 2 - Storage-to-Space Heating: This mode activates when space heating is required (but is not available from the collector) and the storage temperature exceeds the building ambient temperature by 5°F. This mode terminates when the building ambient temperature equals the storage temperature or when space heating is no longer required.

Mode 3 - Collector-to-Space Heating: This mode activates when space heating is required and the collector supply-duct air temperature is 10°F higher than the building ambient air temperature. This mode terminates when the temperature difference drops to less than 6°F or the space heating requirement is satisfied.

Mode 4 - Auxiliary Energy-to-Space Heating: This mode activates when heat is required in the living area and thermal energy is not available from the collectors or storage. Hot water is circulated from the domestic water heater to the air-handler heat exchanger and back to the water heater. This mode deactivates when the requirement for heat is satisfied.

Mode 5 - Summer Mode, Passive Cooling Storage: This mode can be activated when the residents wish to store cool air in storage for circulation the next day. The air-handler fan activates and an outside air-intake damper opens to allow the cool air to circulate through the attic and storage.

Mode 6 - Summer Mode, Space Cooling: This mode can be activated when cool air from storage is desired in the living area. The outside air-intake damper closes, the duct to the living area opens, and the air-handler fan activates.

Mode 7 - DHW Preheating: This mode activates when there is a demand for hot water. Water is drawn from the conventional DHW tank and replenished with heated water from the preheat tank. The DHW subsystem has this one independent mode of operation for preheating.

II. PERFORMANCE EVALUATION

INTRODUCTION

Although the site was occupied during June, no attempt was made to collect or store solar energy nor was there a space heating load. The DHW thermosiphoning system provided 0.58 million Btu to a hot water load of 1.27 million Btu.

During this reporting period the residents did not attempt to store cool nighttime air in the storage bin (mode 5) for use during the day (mode 6). The occupants did, however, use the air-handler blower to circulate air through the house during the day. In the attached report, the incidental energy transfer to and from storage during this mode of operation is evident for the first three days of June (see "Storage Performance"). Thereafter, flowmeter W151 became inoperative and the measurement of energy transfer was not possible.

WEATHER CONDITIONS

During the month, total incident solar energy on the collector array was 16.7 million Btu for a daily average of 1341 Btu per square foot. This was below the estimated average daily solar radiation for this geographical area during June of 1399 Btu per square foot for a south-facing plane with a tilt of 51 degrees to the horizontal. The average ambient temperature during June was 72°F as compared with the long-term average for June of 76°F.

THERMAL PERFORMANCE

Collector - The total incident solar radiation on the collector array for the month of June was 16.7 million Btu, although no attempt was made to collect or store solar energy during this period.

Storage - Solar energy was not delivered to storage, although air from the living area was circulated through the relatively cool storage bin to provide cooler inside ambient air. Therefore, the thermal energy mass in storage was probably reduced by this method of operation. The quantities presented as negative values for June 1 and 2 in the "transfer from" column of the attached Storage Performance report indicate a reduction in thermal energy mass. Data for the balance of the month is not available. The average storage temperature for the month was 75°F.

DHW Load - The DHW subsystem consumed 0.58 million Btu of solar energy and at least 0.69 million Btu of auxiliary fossil fuel energy to satisfy a hot water load of 1.27 million Btu. The amount of the losses from the DHW subsystem are unknown. The DHW thermosiphoning subsystem does not consume operating energy; therefore, a fossil fuel energy savings of 0.96 million Btu resulted. A daily average of 78 gallons of DHW was consumed at an average temperature of 142°F delivered from the tank.

OBSERVATIONS

The gas flow totalizer used to quantify gas consumption and the air flowmeter W151 are not providing valid data. The measurement of auxiliary thermal energy consumption in the DHW subsystem will not be available until the totalizer is replaced. Also, measurement of air flow from storage is not possible until the flowmeter problem is corrected.

ENERGY SAVINGS

The solar energy system (specifically, the DHW thermosiphoning system) provided a fossil fuel energy savings of 0.96 million Btu without any offsetting electrical energy operating expense.

III. ACTION STATUS

Boeing will forward a gas totalizer for installation by the grantee before the next heating season. A schedule date has not been set for the flowmeter checkout.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SITE SUMMARY

SITE: HELIOTHERMICS, INC. LOT 6, GREENVILLE, SC SOLAR/1025-79/06
REPORT PERIOD: JUNE,1979

SITE/SYSTEM DESCRIPTION:
THE HELIOTHERMICS SOLAR ENERGY SYSTEM PROVIDES SPACE HEATING AND DOMESTIC HOT WATER PREHEATING. IN THE SPACE HEATING SUBSYSTEM, THERMAL ENERGY IS TRANSFERRED BY AIR CIRCULATION FROM THE ATTIC TO THE LOAD OR TO CRUSHED ROCK IN AN INSULATED CONCRETE BIN. IN THE DOMESTIC HOT WATER SUBSYSTEM, SOLAR ENERGY IS COLLECTED FROM A 70 SQ. FT ALUMINUM AND COPPER PADDLE IN THE ATTIC AND TRANSFERRED TO AN 80 GAL. PREHEAT TANK BY THERMOSIPHONING. AUXILIARY ENERGY IS PROVIDED TO BOTH SUBSYSTEMS BY A COMMON NATURAL GAS WATER HEATER.

GENERAL SITE DATA:

INCIDENT SOLAR ENERGY	16.738	MILLION BTU
	40235	BTU/SQ.FT.
COLLECTED SOLAR ENERGY	0.000	MILLION BTU
	0	BTU/SQ.FT.
AVERAGE AMBIENT TEMPERATURE	72	DEGREES F
AVERAGE BUILDING TEMPERATURE	77	DEGREES F
ECSS SOLAR CONVERSION EFFICIENC.	0.03	
ECSS OPERATING ENERGY	0.000	MILLION BTU
TOTAL SYSTEM OPERATING ENERGY	0.000	MILLION BTU
TOTAL ENERGY CONSUMED	*	MILLION BTU

SUBSYSTEM SUMMARY:

	HOT WATER	HEATING	COOLING	SYSTEM TOTAL
LOAD	1.269	0.000	N.A.	1.269 MILLION BTU
SOLAR FRACTION	*	0	N.A.	* PERCENT
SOLAR ENERGY USED	0.577	0.000	N.A.	0.577 MILLION BTU
OPERATING ENERGY	N.A.	0.000	N.A.	0.000 MILLION BTU
AUX. THERMAL ENERGY	*	0.000	N.A.	* MILLION BTU
AUX. ELECTRIC FUEL	N.A.	N.A.	N.A.	N.A. MILLION BTU
AUX. FOSSIL FUEL	*	0.000	N.A.	* MILLION BTU
ELECTRICAL SAVINGS	N.A.	0.000	N.A.	0.000 MILLION BTU
FOSSIL SAVINGS	0.962	0.000	N.A.	0.962 MILLION BTU

SYSTEM PERFORMANCE FACTOR: *

* DENOTES UNAVAILABLE DATA
@ DENOTES NULL DATA
N.A. DENOTES NOT APPLICABLE DATA

REFERENCE: USER'S GUIDE TO THE MONTHLY PERFORMANCE REPORT OF THE NATIONAL SOLAR DATA PROGRAM,FEBRUARY 28,1978, SOLAR/0004-78/18

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SITE SUMMARY

SITE: HELIOTHERMICS, INC. LOT 6, GREENVILLE, SC SOLAR/1025-79/06
REPORT PERIOD: JUNE,1979

SITE/SYSTEM DESCRIPTION:
THE HELIOTHERMICS SOLAR ENERGY SYSTEM PROVIDES SPACE HEATING AND DOMESTIC HOT WATER PREHEATING. IN THE SPACE HEATING SUBSYSTEM, THERMAL ENERGY IS TRANSFERRED BY AIR CIRCULATION FROM THE ATTIC TO THE LOAD OR TO CRUSHED ROCK IN AN INSULATED CONCRETE BIN. IN THE DOMESTIC HOT WATER SUBSYSTEM, SOLAR ENERGY IS COLLECTED FROM A 70 SQ. FT ALUMINUM AND COPPER PADDLE IN THE ATTIC AND TRANSFERRED TO AN 80 GAL. PREHEAT TANK BY THERMOSIPHONING. AUXILIARY ENERGY IS PROVIDED TO BOTH SUBSYSTEMS BY A COMMON NATURAL GAS WATER HEATER.

GENERAL SITE DATA:

INCIDENT SOLAR ENERGY	17.658	GIGA JOULES
	456904	KJ/SQ.M.
COLLECTED SOLAR ENERGY	0.000	GIGA JOULES
	0	KJ/SQ.M.
AVERAGE AMBIENT TEMPERATURE	22	DEGREES C
AVERAGE BUILDING TEMPERATURE	25	DEGREES C
ECSS SOLAR CONVERSION EFFICIENCY	0.03	
ECSS OPERATING ENERGY	0.000	GIGA JOULES
TOTAL SYSTEM OPERATING ENERGY	0.000	GIGA JOULES
TOTAL ENERGY CONSUMED	*	GIGA JOULES

SUBSYSTEM SUMMARY:

	HOT WATER	HEATING	COOLING	SYSTEM TOTAL
LOAD	1.338	0.000	N.A.	1.338 GIGA JOULES
SOLAR FRACTION	*	0	N.A.	* PERCENT
SOLAR ENERGY USED	0.609	0.000	N.A.	0.609 GIGA JOULES
OPERATING ENERGY	N.A.	0.000	N.A.	0.000 GIGA JOULES
AUX. THERMAL ENG	*	0.000	N.A.	* GIGA JOULES
AUX. ELECTRIC FUEL	N.A.	N.A.	N.A.	N.A. GIGA JOULES
AUX. FOSSIL FUEL	*	0.000	N.A.	* GIGA JOULES
ELECTRICAL SAVINGS	N.A.	0.000	N.A.	0.000 GIGA JOULES
FOSSIL SAVINGS	1.015	0.000	N.A.	1.015 GIGA JOULES

SYSTEM PERFORMANCE FACTOR: *

* DENOTES UNAVAILABLE DATA
@ DENOTES NULL DATA
N.A. DENOTES NOT APPLICABLE DATA

REFERENCE: USER'S GUIDE TO THE MONTHLY PERFORMANCE REPORT OF THE NATIONAL SOLAR DATA PROGRAM,FEBRUARY 28,1978. SOLAR/0004-78/18

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
ENERGY COLLECTION AND STORAGE SUBSYSTEM (ECSS)

SITE: HELIOTHERMICS, INC. LOT 6, GREENVILLE, SC SOLAR/1025-79/06
REPORT PERIOD: JUNE,1979

DAY OF MONTH	INCIDENT SOLAR ENERGY MILLION BTU	AMBIENT TEMP DEG-F	ENERGY TO LOADS MILLION BTU	AUX THERMAL TO ECSS MILLION BTU	ECSS OPERATING ENERGY MILLION BTU	ECSS ENERGY REJECTED MILLION BTU	ECSS SOLAR CONVERSION EFFICIENCY
1	0.521	74	0.009	N	0.000	N	0.018
2	0.594	76	0.028	O	0.000	O	0.047
3	0.430	73	0.005	T	0.000	T	0.012
4	0.537	73	0.023		0.000		0.042
5	0.697	72	0.010	A	0.000	A	0.015
6	0.287	71	0.021	P	0.000	P	0.075
7	0.525	77	0.025	P	0.000	P	0.048
8	0.288	73	0.013	L	0.000	L	0.046
9	0.593	76	0.020	I	0.000	I	0.033
10	0.404	76	0.004	C	0.000	C	0.009
11	1.044	71	0.048	A	0.000	A	0.046
12	0.781	67	0.015	B	0.000	B	0.019
13	0.788	69	0.018	L	0.000	L	0.023
14	0.650	69	0.024	E	0.000	E	0.036
15	0.491	67	0.027		0.000		0.055
16	0.088	63	0.005		0.000		0.056
17	0.400	66	0.007		0.000		0.017
18	0.642	77	0.021		0.000		0.032
19	0.636	78	0.032		0.000		0.050
20	0.312	71	0.009		0.000		0.029
21	0.330	70	0.013		0.000		0.040
22	0.710	76	0.029		0.000		0.041
23	0.741	77	0.027		0.000		0.037
24	0.527	76	0.015		0.000		0.029
25	0.306	65	0.017		0.000		0.056
26	0.769	67	0.030		0.000		0.039
27	0.722	68	0.016		0.000		0.023
28	0.739	70	0.028		0.000		0.038
29	0.507	72	0.025		0.000		0.050
30	0.678	73	0.012		0.000		0.018
SUM	16.738	-	0.577	N.A.	0.000	N.A.	-
AVG	0.558	72	0.019	N.A.	0.000	N.A.	0.034
NBS ID	Q001	N113			Q102		N111

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
COLLECTOR ARRAY PERFORMANCE

SITE: HELIOTHERMICS, INC. LOT 6, GREENVILLE, SC SCLAR/1025-79/06
REPORT PERIOD: JUNE,1979

DAY OF MONTH	INCIDENT SOLAR ENERGY MILLION BTU	OPERATIONAL INCIDENT ENERGY MILLION BTU	COLLECTED SOLAR ENERGY MILLION BTU	DAYTIME AMBIENT TEMP DEG F	COLLECTOR ARRAY EFFICIENCY
1	0.521	0.000	0.000	82	0.000
2	0.594	0.000	0.000	88	0.000
3	0.430	0.000	0.000	79	0.000
4	0.537	0.000	0.000	*	0.000
5	0.697	0.000	0.000	81	0.000
6	0.287	0.000	0.000	78	0.000
7	0.525	0.000	0.000	83	0.000
8	0.288	0.000	0.000	73	0.000
9	0.593	0.000	0.000	84	0.000
10	0.404	0.000	0.000	83	0.000
11	1.044	0.000	0.000	76	0.000
12	0.781	0.000	0.000	81	0.000
13	0.788	0.000	0.000	80	0.000
14	0.650	0.000	0.000	79	0.000
15	0.491	0.000	0.000	74	0.000
16	0.088	0.000	0.000	64	0.000
17	0.400	0.000	0.000	72	0.000
18	0.642	0.000	0.000	90	0.000
19	0.636	0.000	0.000	90	0.000
20	0.312	0.000	0.000	73	0.000
21	0.330	0.000	0.000	75	0.000
22	0.710	0.000	0.000	88	0.000
23	0.741	0.000	0.000	88	0.000
24	0.527	0.000	0.000	83	0.000
25	0.306	0.000	0.000	67	0.000
26	0.769	0.000	0.000	75	0.000
27	0.722	0.000	0.000	78	0.000
28	0.739	0.000	0.000	84	0.000
29	0.507	0.000	0.000	83	0.000
30	0.676	0.000	0.000	81	0.000
SUM	16.738	0.000	0.000	-	-
AVG	0.558	0.000	0.000	80	0.000
NBSID	C001		C100		N100

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
STORAGE PERFORMANCE

SITE: HELIOTHERMICS, INC. LOT 6, GREENVILLE, SC SOLAR/1025-79/06
REPORT PERIOD: JUNE,1979

DAY OF MONTH	ENERGY TO STORAGE MILLION BTU	ENERGY FROM STORAGE MILLION BTU	CHANGE IN STORED ENERGY MILLION BTU	STORAGE AVERAGE TEMP DEG F	STORAGE EFFICIENCY
1	0.000	-0.022	0.019	74	1.000
2	0.000	-0.013	-0.011	74	1.000
3	0.000	-0.000	0.002	74	1.000
4	0.000	0.000	0.002	74	1.000
5	0.000	0.000	-0.000	74	1.000
6	0.000	0.000	-0.002	74	1.000
7	0.000	0.000	0.008	74	1.000
8	0.000	0.000	0.029	75	1.000
9	0.000	0.000	0.008	77	1.000
10	0.000	0.000	0.013	77	1.000
11	0.000	0.000	-0.005	78	1.000
12	0.000	0.000	-0.025	76	1.000
13	0.000	0.000	-0.017	75	1.000
14	0.000	0.000	-0.011	74	1.000
15	0.000	0.000	-0.002	74	1.000
16	0.000	0.000	-0.004	74	1.000
17	0.000	0.000	-0.004	74	1.000
18	0.000	0.000	0.011	74	1.000
19	0.000	0.000	0.042	75	1.000
20	0.000	0.000	0.008	77	1.000
21	0.000	0.000	-0.019	77	1.000
22	0.000	0.000	-0.006	76	1.000
23	0.000	0.000	0.013	76	1.000
24	0.000	0.000	0.011	77	1.000
25	0.000	0.000	-0.017	77	1.000
26	0.000	0.000	-0.013	76	1.000
27	0.000	0.000	-0.011	75	1.000
28	0.000	0.000	0.002	75	1.000
29	0.000	0.000	0.004	75	1.000
30	0.000	0.000	0.019	76	1.000
SUM	0.000	-0.035	0.045	-	-
AVG	0.000	-0.001	0.002	75	1.000
NBS ID	Q200	Q201	Q202		N108

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
HOT WATER SUBSYSTEM

SITE: HELIOTHERMICS, INC. LOT 6, GREENVILLE, SC
REPORT PERIOD: JUNE,1979

SOLAR/1025-79/06

DAY OF MON.	HOT WATER LOAD- MILLION BTU	SOLAR FR.OF LOAD PER CENT	SOLAR ENERGY USED MILLION BTU	OPER ENERGY MILLION BTU	AUX THERMAL USED MILLION BTU	AUX ELECT FUEL MILLION BTU	AUX FOSSIL FUEL MILLION BTU	ELECT ENERGY SAVINGS MILLION BTU	FOSSIL ENERGY SAVINGS MILLION BTU	SUP. WAT. TEMP DEG F	HOT WAT. TEMP DEG F	HOT WATER USED GAL
1	0.025	*	0.009	N	*	N	*	N	0.016	73	141	47
2	0.047	*	0.028	O	*	O	*	O	0.046	84	141	105
3	0.027	*	0.005	T	*	T	*	T	0.009	82	145	44
4	0.053	*	0.023		*		*		0.038	79	139	90
5	0.016	*	0.010	A	*	A	*	A	0.017	76	142	27
6	0.041	*	0.021	P	*	P	*	P	0.036	77	140	68
7	0.067	*	0.025	P	*	P	*	P	0.042	80	140	129
8	0.043	*	0.013	L	*	L	*	L	0.022	79	144	76
9	0.057	*	0.020	I	*	I	*	I	0.033	82	145	121
10	0.018	*	0.004	C	*	C	*	C	0.006	79	146	30
11	0.069	*	0.048	A	*	A	*	A	0.079	79	139	137
12	0.020	*	0.015	B	*	B	*	B	0.025	78	135	38
13	0.023	*	0.018	L	*	L	*	L	0.031	75	140	40
14	0.030	*	0.024	E	*	E	*	E	0.039	78	140	63
15	0.074	*	0.027		*		*		0.045	77	143	127
16	0.053	*	0.005		*		*		0.008	73	147	82
17	0.032	*	0.007		*		*		0.011	71	144	49
18	0.066	*	0.021		*		*		0.035	81	143	126
19	0.067	*	0.032		*		*		0.053	84	141	136
20	0.020	*	0.009		*		*		0.015	76	141	36
21	0.050	*	0.013		*		*		0.022	77	146	85
22	0.051	*	0.029		*		*		0.048	81	142	103
23	0.033	*	0.027		*		*		0.046	82	141	72
24	0.038	*	0.015		*		*		0.025	81	141	71
25	0.058	*	0.017		*		*		0.029	75	146	96
26	0.051	*	0.030		*		*		0.050	75	145	92
27	0.047	*	0.016		*		*		0.027	76	145	83
28	0.033	*	0.028		*		*		0.046	78	141	68
29	0.045	*	0.025		*		*		0.042	80	142	83
30	0.014	*	0.012		*		*		0.020	79	138	29
SUM	1.269	-	0.577	N.A.	*	N.A.	*	N.A.	0.962	-	-	2352
AVG	0.042	*	0.019	N.A.	*	N.A.	*	N.A.	0.032	78	142	78
NBS	Q302	N300	Q300	Q303	Q301	Q305	Q306	Q311	Q313	N305	N307	N308

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SPACE HEATING SUBSYSTEM

SITE: HELIOTHERMICS, INC. LOT 6, GREENVILLE, SC SOLAR/1025-79/06
REPORT PERIOD: JUNE,1979

DAY OF MON.	SPACE HEATING LOAD MILLION BTU	SOLAR FR.OF LOAD PCT	SOLAR ENERGY USED MILLION BTU	OPER ENERGY MILLION BTU	AUX THERMAL USED MILLION BTU	AUX ELECT FUEL MILLION BTU	AUX FOSSIL FUEL MILLION BTU	ELECT ENERGY SAVINGS MILLION BTU	FOSSIL ENERGY SAVINGS MILLION BTU	BLDG TEMP DEG. F	AMB TEMP DEG. F
1	0.000	0	0.000	0.000	0.000	N	0.000	0.000	0.000	77	74
2	0.000	0	0.000	0.000	0.000	O	0.000	0.000	0.000	77	76
3	0.000	0	0.000	0.000	0.000	T	0.000	0.000	0.000	77	73
4	0.000	0	0.000	0.000	0.000		0.000	0.000	0.000	77	73
5	0.000	0	0.000	0.000	0.000	A	0.000	0.000	0.000	77	72
6	0.000	0	0.000	0.000	0.000	P	0.000	0.000	0.000	77	71
7	0.000	0	0.000	0.000	0.000	P	0.000	0.000	0.000	78	77
8	0.000	0	0.000	0.000	0.000	L	0.000	0.000	0.000	79	73
9	0.000	0	0.000	0.000	0.000	I	0.000	0.000	0.000	79	76
10	0.000	0	0.000	0.000	0.000	C	0.000	0.000	0.000	80	76
11	0.000	0	0.000	0.000	0.000	A	0.000	0.000	0.000	78	71
12	0.000	0	0.000	0.000	0.000	B	0.000	0.000	0.000	75	67
13	0.000	0	0.000	0.000	0.000	L	0.000	0.000	0.000	76	69
14	0.000	0	0.000	0.000	0.000	E	0.000	0.000	0.000	76	69
15	0.000	0	0.000	0.000	0.000		0.000	0.000	0.000	76	67
16	0.000	0	0.000	0.000	0.000		0.000	0.000	0.000	74	63
17	0.000	0	0.000	0.000	0.000		0.000	0.000	0.000	74	66
18	0.000	0	0.000	0.000	0.000		0.000	0.000	0.000	77	77
19	0.000	0	0.000	0.000	0.000		0.000	0.000	0.000	79	78
20	0.000	0	0.000	0.000	0.000		0.000	0.000	0.000	78	71
21	0.000	0	0.000	0.000	0.000		0.000	0.000	0.000	76	70
22	0.000	0	0.000	0.000	0.000		0.000	0.000	0.000	78	76
23	0.000	0	0.000	0.000	0.000		0.000	0.000	0.000	78	77
24	0.000	0	0.000	0.000	0.000		0.000	0.000	0.000	79	76
25	0.000	0	0.000	0.000	0.000		0.000	0.000	0.000	77	65
26	0.000	0	0.000	0.000	0.000		0.000	0.000	0.000	75	67
27	0.000	0	0.000	0.000	0.000		0.000	0.000	0.000	77	68
28	0.000	0	0.000	0.000	0.000		0.000	0.000	0.000	78	70
29	0.000	0	0.000	0.000	0.000		0.000	0.000	0.000	78	72
30	0.000	0	0.000	0.000	0.000		0.000	0.000	0.000	78	73
SUM	0.000	-	0.000	0.000	0.000	N.A.	0.000	0.000	0.000	-	-
AVG	0.000	0	0.000	0.000	0.000	N.A.	0.000	0.000	0.000	77	72
NBS	Q402	N400	Q400	Q403	Q401		Q410	Q415	Q417	N406	N113

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
ENVIRONMENTAL SUMMARY

SITE: HELIOTHERMICS, INC. LOT 6, GREENVILLE, SC SOLAR/1025-79/06
REPORT PERIOD: JUNE,1979

DAY OF MONTH	TOTAL INSOLATION BTU/SQ.FT	DIFFUSE INSOLATION BTU/SQ.FT	AMBIENT TEMPERATURE DEG F	DAYTIME AMBIENT TEMP DEG F	RELATIVE HUMIDITY PERCENT	WIND DIRECTION DEGREES	WIND SPEED M.P.H.
1	1253	N	74	82	N	N	N
2	1427	O	76	88	O	O	O
3	1033	T	73	79	T	T	T
4	1290		73	*			
5	1676	A	72	81	A	A	A
6	689	P	71	78	P	P	P
7	1262	P	77	83	P	P	P
8	693	L	73	73	L	L	L
9	1424	I	76	84	I	I	I
10	972	C	76	83	C	C	C
11	2511	A	71	76	A	A	A
12	1878	B	67	81	B	B	B
13	1894	L	69	80	L	L	L
14	1562	E	69	79	E	E	E
15	1180		67	74			
16	212		63	64			
17	962		66	72			
18	1543		77	90			
19	1528		78	90			
20	750		71	73			
21	793		70	75			
22	1706		76	88			
23	1782		77	88			
24	1267		76	83			
25	737		65	67			
26	1849		67	75			
27	1736		68	78			
28	1775		70	84			
29	1218		72	83			
30	1631		73	81			
SUM	40235	N.A.	-	-	-	-	-
AVG	1341	N.A.	72	80	N.A.	N.A.	N.A.
NBS ID	C001		N113			N115	N114

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

UNIVERSITY OF FLORIDA
3 1262 09074 5471